ment of the catheter tip was associated with fewer shunt failures, as demonstrated in 9 clinical studies investigating accurate catheter placement using the AxiEM™ IGNS (Medtronic Inc). In addition to being costly, studies showed shunt revision surgery was associated with significant morbidity and lower long-term QOL. In a study of 80 paediatric Hydrocephalus patients, investigators found that patients with a history of two or more shunt revision surgeries had a significantly worse QOL ($p<0.02$), as measured by the Hydrocephalus Outcomes Questionnaire (HOQ). **CONCLUSIONS:** The use of IGNS significantly increases the accuracy of ventricular catheter placement compared to freehand techniques in hydrocephalus patients undergoing ventricular shunt insertion. Clinical studies have shown the use of IGNS in shunt placement surgery results in lower shunt failure rates, which improve QOL and lowers the economic impact to payers.

PND10

ASSESSING THE COMPARATIVE OUTCOMES FROM TERIFLUNOMIDE AND DIMETHYL FUMARATE STUDIES IN RELAPSING MS: USE OF "NUMBER NEEDED TO TREAT" ANALYSIS

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OBJECTIVES: Teriflunomide and dimethyl fumarate (DMF), oral therapies for relapsing–remitting multiple sclerosis (RRMS), have demonstrated efficacy in clinical trials. Despite challenges in comparing outcomes across studies, exploratory analyses of treatment effects can be compared informally using relative reductions in a specific endpoint. However, these outcomes do not account for differences in disease severity among study populations or differences on very low event rates. The number needed to treat (NNT) to prevent an event is an important outcome to consider for any comparisons within the field of MS. **METHODS:** NNTs were derived using data from studies with teriflunomide 14 mg (TEMSO, NCT00134563; TOWER, NCT00751881) or DMF (DEFINE, NCT00420212; CONFIRM, NCT00451451) based on inverse of absolute differences between treatment and placebo groups. **RESULTS:** Teriflunomide studies included patients with progressive disease; patients in DEFINE had slightly lower Expanded Disability Status Scale scores. Teriflunomide and DMF significantly reduced risk of relapse (all studies). NNTs to prevent one relapse were similar across studies (5.9 [TEMSO], 5.6 [TOWER], 5.3 [DEFINE], 5.6 [CONFIRM]). Risk of disability progression sustained for 12 weeks was significantly reduced in TEMSO, TOWER, and DEFINE but not CONFIRM. Corresponding NNTs to prevent disability progression were 13.8, 17.4, 10.8, and 30.2. Risk of relapse leading to hospitalization was significantly reduced in TEMSO and TOWER but not in DEFINE and CONFIRM. Corresponding NNTs were lower in TEMSO (12.5) and TOWER (20) than in DEFINE (50) and CONFIRM (50). **CONCLUSIONS:** Using the NNT approach, we demonstrate a comparable effect size for teriflunomide and DMF on relapse. NNTs to prevent disability progression with teriflunomide showed a consistent significant reduction in risk versus placebo in both TEMSO and TOWER, whereas for DMF, comparable NNTs were observed only in DEFINE, and not in CONFIRM. Reduction of risk for relapse leading to hospitalization was significant only for teriflunomide.

PND11

THE CLINICAL EVIDENCE BASE OF TREATMENT OPTIONS IN ALZHEIMER'S DISEASE: A SYSTEMATIC LITERATURE SEARCH

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OBJECTIVES: Alzheimer's Disease (AD) destroys brain cells, causing problems with memory, thinking, and behavior severe enough to affect work, family and social relationships, and basic activities of daily living. AD gets worse over time, it is incurable and fatal. Donepezil, galantamine, rivastigmine and memantine are the current treatment options but the latest evidence was not systematically reviewed recently. **METHODS:** PubMed, Health Technology Assessment Database, NHS Economic Evaluation Database, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, DAHTA-Datenbank, PSYNDEX and PsycINFOwere searched systematically for randomized-controlled studies. For the abstracts that met the pre-defined inclusion criteria, full text articles were obtained. The abstracts that did not meet the search criteria were excluded. Based on these manuscripts it was evaluated whether each study meets the selection criteria. **RESULTS:** After elimination of duplicates the search indicated above yielded 418 articles of which another 299 were excluded based on the title selection; after abstract review, 82 articles have been reviewed in full text which were also deemed to be relevant based on the research question. For donepezil 24 RCTs were available for which another 4 subgroup and exploratory analyses have been published. For galantamine 11 RCTs with 6 exploratory analysis are available. For rivastigmine 10 RCTs are available with 7 exploratory papers. For memantine 14 RCTs with 6 exploratory analysis were found. Out of those studies eleven head-to-head studies are available; 5 studies comparing donepezil vs memantine, 3 studies comparing donepezil vs rivastigmine and one study each comparing donepezil vs galatamine, rivastagmine vs memantine. There was one study comparing rivastagmine vs donepezil vs galantamine. In comparison the clinical evidence seems diverse dependent on the patient characteristics, study duration, and severity of disease. **CONCLUSIONS:** Appropriate evidence assessment for the approved AD treatments requires clinical expertise and close review of the study characteristics.

PND12

EVALUATION OF DISABILITY PROGRESSION AS AN ENDPOINT IN CLINICAL TRIALS FOR RELAPSING-REMITTING MULTIPLE SCLEROSIS (RRMS): COMPARISON OF THE DEFINE AND CONFIRM STUDIES

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OBJECTIVES: Time to 12-week confirmed disability progression, measured by the Expanded Disability Status Scale (EDSS), is a key endpoint in RRMS trials. However, the EDSS has widely discussed limitations, and several therapies have shown inconsistent results for this endpoint in terms of statistical significance. Here we contextualize differences in 12-week confirmed disability progression results in the Phase 3 studies of gastro-resistant dimethyl fumarate (DMF), DEFINE and CONFIRM. **METHODS:** Time to 12-week confirmed disability progression at 2 years was a secondary endpoint in both studies; however, the studies were not powered to detect statistical significance for this endpoint. Patients had the option of discontinuing study treatment and initiating alternative therapy at any time due to 12-week confirmed disability progression or after completing 48 weeks of study treatment and experiencing one confirmed relapse after 24 weeks (DEFINE) or two confirmed relapses at any time (CONFIRM). **RESULTS:** Although gastro-resistant DMF 240mg BID demonstrated consistent reductions on 12-week confirmed disability progression, statistical significance was achieved in DEFINE ($p=0.0050$) but not CONFIRM ($p=0.2536$). There was an apparent difference in the placebo rate of 12-week confirmed disability progression at 2 years (DEFINE, 27%; CONFIRM, 17%). In CONFIRM, a relatively higher percentage of placebo patients (4.1%) versus gastro-resistant DMF patients (1.7%) switched to alternative MS therapy or withdrew after the time of tentative disability progression without a subsequent EDSS assessment. Additionally, a relatively higher percentage of placebo patients who switched to alternative MS therapy had ≥2 relapses without 12-week confirmed disability progression prior to switch in CONFIRM (45%) compared with DEFINE (16%). **CONCLUSIONS:** Relapse-based criteria for switching to alternative therapy may have contributed to the lower placebo progression rate and decreased assay sensitivity for this particular endpoint in CONFIRM. The totality of evidence needs to be taken into account when assessing a therapy's effect on disability progression.

PND13

A REAL-WORLD ASSESSMENT OF ANNUAL MULTIPLE SCLEROSIS PREVALENCE AND DISEASE-MODIFYING DRUG TREATMENT RATES USING AN ADMINISTRATIVE CLAIMS DATABASE

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OBJECTIVES: To examine annual prevalence and treatment rates of multiple sclerosis (MS) patients using a large US commercial administrative claims database. **METHODS:** Random sample of 5 million lives from the IMS LifeLink Plus database was used for this analysis. Individuals with ≥1 month eligibility were included in the denominator; those with ≥1 month eligibility and an MS diagnosis (ICD-9-CM: 340. xx) were included in the numerator. Presence of a disease-modifying drug (DMD) was defined as ≥1 claim during the calendar year of interest. Baseline demographics and clinical characteristics were evaluated for each group. Annual prevalence (per 10,000) and treatment rates were reported for each calendar year (2006–2012) and were further stratified by age and gender. **RESULTS:** MS patients were older than patients without MS (mean age range 46.8–47.7 vs. 34.4-35.1, respectively) and more likely to be female (73% vs. 51%, respectively). Comorbidities such as gastrointestinal disorders (42.8%), hypertension (43.5%), arthritis (24.8%) and anxiety (22.8%) were common among MS patients (2006 estimates). MS prevalence ranged from 16.4/10,000 (2006) to 17.8/10,000 (2010). Similar patterns over the years were observed when data were stratified by sex and age, with absolute rates being higher among women vs. men (24.4/10,000 vs. 8.2/10,000, respectively; 2012; $P<0.001$) and patients aged 45–64 years (29.4/10,000 vs. 0.4/, 15.6/ and 18.2/10,000 patients aged <18, 18–44 and ≥65, respectively; $P<0.001$). The proportion of MS patients receiving a DMD increased from 2006 (42.5%) to 2012 (51.2%) ($P<0.001$). Similar rates and trends in the proportion of patients with a DMD were observed when stratified by gender (42.8% (2006) and 51.3% (2012) [female]; 41.5% (2006) and 50.7% (2012) [male]; both $P<0.001$). **CONCLUSIONS:** In a recent 5-year period, MS prevalence in a large US insured population increased slightly, with a greater increase in the likelihood of DMD use.

PND14

THE CHARACTERISTICS OF MULTIPLE SCLEROSIS IN IRAN

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OBJECTIVES: Multiple Sclerosis (MS) is a chronic disease of the Central Nerve System. The aim of this paper is to characterize the various clinical and demographical feature of the MS population. **METHODS:** In a 6-month cross-sectional study248 patients were investigated in Khorasan provinces. Data was collected by employing a 32- item self-administered questionnaire in a face to face interview. **RESULTS:** A total of 248 patients were recruited (186 female, 75%; 62 male, 25%). The mean age was 31.9±8.7, the mean onset age was 26.3 (26.3±8: 1) and the median duration of illness was 3.8 years. The prevalence and incidence were estimated to be 25/100000 and 2.5/100,000 respectively. Significantly more patients had a Relapsing Remitting MS course. Self reported character of MS individuals were significantly more (193, 77.8%) regarding nervous character (p value=.000). A family history of ms was reported in 11%. However, there was no a significant difference between men and women with respect to age, age of onset, BMI, disease duration and gap between clinical onset and diagnosis. The education level was reported as 154 (62%) had a bachelor and greater degree and 94 (38%) had a diploma or under-diploma degree. Thirty six percents of the patients were born in the spring. **CONCLUSIONS:** In contrast to reports from Caucasians, the Iranian differs with respect to age, age of onset of illness, disease duration, family history, sex ratio. The sex ratio of 3: 1 in this study is somewhat higher than the usual 2: 1 in the standard text and seen in Asia or the neighboring Arab countries. This might reflect the role of hormone or genetic factors or much more visiting by women, or women stressful life. These included BMI, birth season, education stand. The educated people in developing country are probably likely to adopt a "western" lifestyle, therefore more probably to get the risk of developing Western disease.